

WHAT IS CLAIMED IS:

1. A nucleic acid fragment selected from any of a
base sequence shown in SEQ ID NOs: 1 to 9, or
complementary base sequence thereof, or modified
5 sequence subjected to a mutation based on these base
sequences.

2. A nucleic acid fragment that can be utilized
as a primer or probe comprising the nucleic acid
10 fragment according to claim 1, or a nucleic acid
fragment comprising a partial sequence in a base
sequence thereof.

3. The nucleic acid fragment according to claim
15 1, wherein a mutation based on a base sequence shown in
SEQ ID NOs: 1 to 9 or a complementary base sequence
thereof is partial deletion of the base sequence,
addition of an extra base or base sequence, or
substitution of bases or partial sequence in the base
20 sequence with other base or base sequence, or
combination thereof.

4. The nucleic acid fragment according to claim
2, wherein a mutation based on a base sequence shown in
25 SEQ ID NOs: 1 to 9 or a complementary base sequence
thereof is partial deletion of the base sequence,
addition of an extra base or base sequence, or

substitution of bases or partial sequence in the base sequence with other base or base sequence, or combination thereof.

5 5. A primer comprising a nucleic acid fragment that can be utilized as a primer according to any one of claim 2, 3 or 4, in which, as an additional modification, a marker bound onto a molecule of said nucleic acid fragment, and/or a moiety capable of
10 binding to a solid-phase carrier may be introduced.

 6. A probe comprising a nucleic acid fragment that can be utilized as a probe according to any one of claim 2, 3 or 4, in which, as an additional
15 modification, a marker bound onto a molecule of said nucleic acid fragment, and/or a moiety capable of binding to a solid-phase carrier may be introduced.

 7. A primer comprising a combination of two kinds
20 of nucleic acid fragments with a substantial difference in base sequence, wherein at least one of said two kinds of nucleic acid fragments is a nucleic acid fragment for a primer according to claim 5, and
 a marker, and/or a moiety capable of binding to a
25 solid-phase carrier may be introduced into each molecule of said two nucleic acid fragments.

8. The primer according to any of claim 5,
wherein the base sequence of a nucleic acid fragment
for primer according to claim 5 is a modified base
sequence subjected to a mutation, such as partial
5 deletion of the base sequence, addition of an extra
base or base sequence, or substitution of a base or
partial sequence in the base sequence with other base
or base sequence, or combination thereof, based on a
base sequence shown in SEQ ID NO: 1 to 9 or
10 complementary base sequence thereof.

9. The primer according to claim 7, wherein the
base sequence of a nucleic acid fragment for primer
according to claim 5 is a modified base sequence
15 subjected to a mutation, such as partial deletion of
the base sequence, addition of an extra base or base
sequence, or substitution of a base or partial sequence
in the base sequence with other base or base sequence,
or combination thereof, based on a base sequence shown
20 in SEQ ID NO: 1 to 9 or complementary base sequence
thereof.

10. The primer or probe according to claim 5,
wherein said primer or probe comprises at least one
25 kind of nucleic acid fragment subjected to an
additional modification, and the additional
modification in one kind of said nucleic acid fragment

is introduction of a marker or moiety capable of binding to a solid-phase carrier into a 5'-terminal side of the nucleic acid fragment.

5 11. The primer or probe according to claim 6,
wherein said primer or probe comprises at least one
kind of nucleic acid fragment subjected to an
additional modification, and the additional
modification in one kind of said nucleic acid fragment
10 is introduction of a marker or moiety capable of
binding to a solid-phase carrier into a 5'-terminal
side of the nucleic acid fragment.

15 12. The primer or probe according to claim 7,
wherein said primer or probe comprises at least one
kind of nucleic acid fragment subjected to an
additional modification, and the additional
modification in one kind of said nucleic acid fragment
is introduction of a marker or moiety capable of
20 binding to a solid-phase carrier into a 5'-terminal
side of the nucleic acid fragment.

25 13. The primer or probe according to claim 8,
wherein said primer or probe comprises at least one
kind of nucleic acid fragment subjected to an
additional modification, and the additional
modification in one kind of said nucleic acid fragment

is introduction of a marker or moiety capable of binding to a solid-phase carrier into a 5'-terminal side of the nucleic acid fragment.

5 14. The primer or probe according to claim 5, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue, 2,4-dinitrophenyl group, and digoxigenin residue.

10 15. The primer or probe according to claim 6, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue,
15 2,4-dinitrophenyl group, and digoxigenin residue.

 16. The primer or probe according to any of claim 7 or 8, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a
20 molecule as an additional modification is any of biotin residue, 2,4-dinitrophenyl group, and digoxigenin residue.

 17. The primer or probe according to claim 9,
25 wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue,

2,4-dinitrophenyl group, and digoxigenin residue.

18. The primer or probe according to any one of
claims 10 to 13, wherein a marker or a moiety capable
5 of binding to a solid-phase carrier to be introduced
into a molecule as an additional modification is any of
biotin residue, 2,4-dinitrophenyl group, and
digoxigenin residue.

10 19. A method of detecting a PHA synthesizing
microorganism, wherein said method uses at least one
kind of nucleic acid fragment according to any one of
claim 1 to 4 as a probe.

15 20. A method of detecting a polyhydroxyalkanoate
synthesizing microorganism, wherein said method uses at
least one kind of nucleic acid fragment according to
any one of claim 1 to 4 as a primer.

20 21. A method of detecting a polyhydroxyalkanoate
synthesizing microorganism, wherein said method uses a
primer according to claim 5, and comprises the
following four steps of:

(1) preparing a sample in which the presence or
25 absence of a PHA synthesizing microorganism is to be
detected;

(2) performing a lysis treatment of cells in the

sample, if necessary;

(3) adding said primer to the sample and
performing an elongation reaction of the primer; and

(4) performing a detecting operation of the
5 elongation reaction products obtained from the step
(3), or

said steps (1), (3), and (4), as well as step (2),
if necessary, are conducted.

10 22. A method of detecting a polyhydroxyalkanoate
synthesizing microorganism, wherein said method uses a
primer according to claim 7, and comprises the
following four steps of:

(1) preparing a sample in which the presence or
15 absence of a PHA synthesizing microorganism is to be
detected;

(2) performing a lysis treatment of cells in the
sample, if necessary;

(3) adding said primer to the sample and
20 performing an elongation reaction of the primer; and

(4) performing a detecting operation of the
elongation reaction products obtained from the step
(3), or

said steps (1), (3), and (4), as well as step (2),
25 if necessary, are conducted.

23. The method of detecting a
polyhydroxyalkanoate synthesizing microorganism

according to any of claim 21 or 22, wherein said method uses the primer comprising a combination of two kinds of nucleic acid fragments according to claim 7.

5 24. The method of detecting a
polyhydroxyalkanoate synthesizing microorganism
according to any of claim 21 or 22, wherein said
elongation reaction of a primer in step (3) is
performed by a polymerase chain reaction.

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 25. The method of detecting a
polyhydroxyalkanoate synthesizing microorganism
according to claim 23, wherein said elongation reaction
of a primer in step (3) is performed by a polymerase
15 chain reaction.

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